

CLAIMS

What is claimed is:

- 1 1. A method of updating a routing table, the method comprising the computer-implemented
2 steps of:
3 selecting, from a set of routers, a particular router that is associated with a first time that
4 is a shortest time among all times associated with routers in the set of routers;
5 sending a first data packet to the particular router;
6 receiving a second data packet that indicates a second time taken for the first data packet
7 to travel to a destination indicated by the first data packet;
8 updating the first time based on the second time; and
9 updating the routing table based on information contained in the second data packet.
- 1 2. The method of Claim 1, further comprising:
2 updating, based on information contained in the second data packet, a path associated
3 with both the destination and the particular router.
- 1 3. The method of Claim 1, further comprising:
2 updating, based on information contained in the second data packet, an indication of an
3 amount of bandwidth available on a path taken by the second data packet.
- 1 4. The method of Claim 1, further comprising:
2 updating, based on information contained in the second data packet, an indication of
3 whether a path taken by the first data packet is feasible.
- 1 5. The method of Claim 1, further comprising:
2 updating, based on information contained in the second data packet, a list of routers that
3 indicates all routers in a path taken by the first data packet to a router that sent the
4 first data packet to a present router.
- 1 6. The method of Claim 1, further comprising:
2 updating the second data packet to indicate an amount of bandwidth available on a path
3 taken by the second data packet.

- 1 7. The method of Claim 1, further comprising:
2 updating the second data packet to indicate whether a path taken by the first data packet
3 is feasible.
- 1 8. A method of updating a routing table, the method comprising the computer-implemented
2 steps of:
3 for each neighbor router in a set of neighbor routers, associating the neighbor router with
4 an amount of time predicted to be required for a data packet to travel to a
5 specified destination if the data packet is transmitted through the neighbor router;
6 receiving a first data packet that indicates the specified destination;
7 in response to receiving the first data packet, selecting, from the set of neighbor routers, a
8 particular neighbor router that is associated with a first amount of time that is a
9 lowest amount of time, relative to the specified destination, among amounts of
10 time associated with neighbor routers in the set of neighbor routers;
11 sending the first data packet to the particular neighbor router;
12 receiving a second data packet that indicates a second amount of time taken for the first
13 data packet to travel to the specified destination;
14 updating, based on the second amount of time, the first amount of time; and
15 updating, based on information contained in the second data packet, the routing table.
- 1 9. A method of updating a routing table, the method comprising the computer-implemented
2 steps of:
3 for each neighbor router in a set of neighbor routers, associating the neighbor router with
4 an amount of time predicted to be required for a data packet to travel to a
5 specified destination if the data packet is transmitted through the neighbor router;
6 receiving a forward ant data packet that indicates the specified destination;
7 selecting, based on one or more first specified criteria, a subset of the set of neighbor
8 routers;
9 in response to receiving the forward ant data packet, selecting, from the subset of
10 neighbor routers, a particular neighbor router that is associated with a first amount
11 of time that is a lowest amount of time, relative to the specified destination,

12 among amounts of time associated with neighbor routers in the subset of neighbor
13 routers;
14 sending the forward ant data packet to the particular neighbor router;
15 receiving a backward ant data packet that indicates a second amount of time taken for the
16 forward ant data packet to travel to the specified destination;
17 determining, based on information indicated in the backward ant data packet, whether
18 one or more second specified criteria are satisfied; and
19 if the one or more second specified criteria are satisfied, then performing steps
20 comprising:
21 updating, based on the second amount of time, the first amount of time; and
22 if one or more third specified criteria are satisfied, then updating, based on
23 information indicated in the backward ant data packet, the routing table.

1 10. The method of Claim 9, wherein the one or more first specified criteria comprise a
2 criterion that no neighbor router in the subset of neighbor routers is contained in a list of
3 routers that have already been visited by the forward ant data packet.

1 11. The method of Claim 9, further comprising:
2 determining whether any neighbor router in the set of neighbor routers is associated with
3 an amount of time that is lower than the first amount of time; and
4 if any neighbor router in the set of neighbor routers is associated with an amount of time
5 that is lower than the first amount of time, then updating the forward ant data
6 packet to indicate a present router in a loop-avoidance router field of the forward
7 ant data packet.

1 12. The method of Claim 11, wherein a loop-avoidance router field of the backward ant data
2 packet indicates a router indicated by the loop-avoidance router field of the forward ant
3 data packet.

1 13. The method of Claim 12, wherein the one or more second specified criteria comprise a
2 criterion that the router indicated by the loop-avoidance router field of the backward ant
3 data packet is not contained in a list of routers that the forward ant visited after visiting a
4 present router.

- 1 14. The method of Claim 9, wherein the one or more third specified criteria comprise a
2 criterion that the second amount of time is lower than any other amount of time, relative
3 to the specified destination, among amounts of time associated with neighbor routers in
4 the set of neighbor routers.
- 1 15. The method of Claim 9, further comprising:
2 determining whether a router from which the backward ant data packet was received
3 matches a router associated with the destination in the routing table; and
4 if the router from which the backward ant data packet was received does not match the
5 router associated with the destination in the routing table, then updating a path
6 feasibility flag of the backward ant to indicate that a path taken by the forward ant
7 is not feasible.
- 1 16. The method of Claim 15, wherein the one or more third specified criteria comprise a
2 criterion that the path feasibility flag of the backward ant indicates that the path taken by
3 the forward ant is feasible.
- 1 17. The method of Claim 9, wherein the one or more third specified criteria comprise a
2 criterion that a path taken by the forward ant data packet from a present router to the
3 specified destination does not include any routers that are identified in a potential
4 upstream node list.
- 1 18. A computer-readable medium carrying one or more sequences of instructions for
2 updating a routing table, which instructions, when executed by one or more processors,
3 cause the one or more processors to carry out the steps of:
4 selecting, from a set of routers, a particular router that is associated with a first time that
5 is a shortest time among times associated with routers in the set of routers;
6 sending a first data packet to the particular router;
7 receiving a second data packet that indicates a second time taken for the first data packet
8 to travel to a destination indicated by the first data packet;
9 updating, based on the second time, the first time; and
10 updating, based on information contained in the second data packet, the routing table.

- 1 19. An apparatus for updating a routing table, comprising:
2 means for selecting, from a set of routers, a particular router that is associated with a first
3 time that is a shortest time among times associated with routers in the set of
4 routers;
5 means for sending a first data packet to the particular router;
6 means for receiving a second data packet that indicates a second time taken for the first
7 data packet to travel to a destination indicated by the first data packet;
8 means for updating, based on the second time, the first time; and
9 means for updating, based on information contained in the second data packet, the
10 routing table.
- 1 20. An apparatus for updating a routing table, comprising:
2 a network interface that is coupled to a data network for receiving one or more packet
3 flows therefrom;
4 a processor;
5 one or more stored sequences of instructions which, when executed by the processor,
6 cause the processor to carry out the steps of:
7 selecting, from a set of routers, a particular router that is associated with a first
8 time that is a shortest time among times associated with routers in the set
9 of routers;
10 sending a first data packet to the particular router;
11 receiving a second data packet that indicates a second time taken for the first data
12 packet to travel to a destination indicated by the first data packet;
13 updating, based on the second time, the first time; and
14 updating, based on information contained in the second data packet, the routing
15 table.